

APPARATUS AND METHOD FOR UNWINDING A NEEDLE PORTION

FIELD OF THE INVENTION

The present invention relates to an apparatus and method for
5 unwinding a needle portion. More specifically, the invention relates to
an adapter configured to unwind a needle portion from a needle holder
so that the needle can be deposited in a disposal container.

BACKGROUND OF THE INVENTION

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Due to concerns regarding contamination and injury, it is
desirable to have a safe and simple method of disposing used medical
needles (e.g. syringes, sharps). Emphasis has been placed on designing
containers (e.g. phlebotomy disposal containers) that isolate the
15 previously disposed needles from the medical professional that uses the
container. Further, efforts have been made to provide a disposal
container which a medical professional can operate easily and
conveniently.

A typical needle disposal system is illustrated in Figure 1
20 and is described in U.S. Patent No. 5,322,164 issued to Richardson et
al., which is incorporated herein by reference for its teachings related to
needle disposal systems. The disposal container 2 shown in Figure 1
includes a container body 4 and a lid 6. The lid 6 includes a skirt 8
which may be used to engage a top flange of container body 4 (not
25 shown).

It is desirable to insert a used needle through an opening in the lid so that the used needle may be dropped into the container body 4 through the opening. Accordingly, lid 6 includes a first aperture 10 and a second aperture 12. Aperture 10 may be covered by a pivotal closure 14, and aperture 12 may be covered by a pivotal closure 16. Pivotal closures 14 and 16 may be joined by a bridge 18 so that they may be operated in tandem. Aperture 10 is sized larger than aperture 12. With pivotal closure 14 open, medical waste that fits through aperture 10 is simply deposited through aperture 10 and drops into container body 4.

Aperture 12 is specifically sized to receive a needle system 19, which is also illustrated in Figure 1 and described by Richardson et al. in U.S. Patent No. 5,322,164. Needle system 19 includes a needle holder 22 and a needle 26. Needle holder 22 includes a lower opening (not shown) that receives and retains needle 26. In order to retain the needle 26 using the lower opening, needle holder 22 includes two spring loaded side locks 24. When side locks 24 are depressed inwardly, the lower opening expands. When side locks 24 are not depressed inwardly, as shown in Figure 1, the lower opening is in a retracted position. When the lower opening (not shown) is in the expanded position, needle 26 separates from needle holder 22. When the lower opening is in the retracted position, needle 26 is retained by needle holder 22. Aperture 12 includes tapered sides (not shown) which receive a lower portion of the outer wall 23 of needle holder 22. As needle 26 is guided into aperture 12, the tapered sides (not shown) contact and depress side locks 24, so that the lower opening expands and needle 26 is separated from needle holder 22. Needle 26 drops into container body 4, and needle holder 22 is retained or discarded in an appropriate manner.

Lid 6 also defines needle detaching device 20 adjacent to aperture 12. Needle detaching device 20 may be used to unscrew needles which are threaded to a needle holder.

While the disposal system illustrated in Figure 1 provides an effective disposal system for certain medical waste, it does not efficiently accommodate every type of needle system in use. Particularly, many unwinding type needle systems can not be unwound and discarded by using the system illustrated in Figure 1. An unwinding type needle system typically includes a needle and a needle holder, often threaded together. In order to dispose of a needle of an unwinding type needle system, the needle is preferably unwound from the needle holder so that the needle may drop into an accompanying disposal container.

Aperture 12 is not configured to unwind a needle from every configuration of needle holder. For example, while needle detaching device 20 may be used to unwind some types of needles from some types of needle holders, it can not accommodate every type of needle system which requires unwinding for disposal.

As such, medical professionals are often forced to choose one needle system and a corresponding disposal system over another type of system, or alternatively medical professionals stock numerous types of needle systems and disposal systems (resulting in higher costs). Accordingly, there remains a need for a disposal system that can accommodate more than one type of needle holder system.

SUMMARY OF THE INVENTION

According to one aspect of this invention, an apparatus is provided for adapting a disposal container with an opening having a first configuration for use with a needle system having a second configuration. Specifically, in a preferred embodiment, the invention provides an adapter to be inserted into an aperture of a disposal container lid, so that the container may be used to unwind needles from needle systems with varying configurations.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a prior art needle disposal system.

5 Figure 2 is a top view of an embodiment of a lid adapted for use with a disposal container in accordance with an exemplary embodiment of the present invention.

Figure 3 is a partial top view of the lid shown in Figure 2.

Figure 4 is a cross sectional side view of an embodiment of an aperture included in the lid shown in Figure 2.

10 Figure 5 is another cross sectional side view of the aperture shown in Figure 4.

Figure 6 is a perspective view of an embodiment of an adapter in accordance with an exemplary embodiment of the present invention.

15 Figure 7 is a top view of the adapter shown in Figure 6.

Figure 8 is a bottom view of the adapter shown in Figure 6.

Figure 9 is a side view of the adapter shown in Figure 6.

Figure 10 is a cross sectional side view of the adapter shown in Figure 6.

20 Figure 11 is another cross sectional side view of the adapter shown in Figure 6.

Figure 12 is a perspective view of an embodiment of a lid for a disposal container including an adapter in accordance with an exemplary embodiment of the present invention

5 Figure 13 is a perspective view of a needle holder that can be used in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

This invention will now be described with reference to several embodiments selected for illustration in the drawings. It will be appreciated that the scope and spirit of the invention are not limited to the illustrated embodiments. It will further be appreciated that the drawings are not rendered to any particular proportion or scale. Also, any dimensions referred to in the description of the illustrated embodiments are provided merely for the purpose for illustration. The invention is not limited to any particular dimensions, materials, or other details of the illustrated embodiments.

Referring generally to FIGS. 2 – 13, a container system is provided for removing a needle portion from a needle holder 64 of a needle system. The container system includes a receptacle (similar to container body 4 illustrated in Figure 1) defining an opening and a lid 30 configured to cover the opening of the receptacle. The lid 30 defines an aperture 38 having a shape configured to receive a needle system having a first configuration. The container system also includes an adapter 50 that is configured for engagement in lid aperture 38. The adapter 50 defines an aperture 52 having a shape configured to receive a needle system having a second configuration. The adapter 50 is engaged within the lid aperture 38 such that rotation of the adapter 50 with respect to said lid 38 is resisted.

In an exemplary embodiment of the present invention, Figure 2 provides an illustration of a top view of a lid 30 which can be used as an alternative to the prior art lid 6 shown in Figure 1. Lid 30 shown in Figure 2 includes an aperture 36 and a funnel-shaped aperture 38. Aperture 36 can be covered by a pivotal closure 32, and a funnel-shaped aperture 38 can be covered by a pivotal closure 34. A Bridge 42 may be provided, connecting pivotal closures 32 and 34, such that pivotal closures 32 and 34 may be operated in tandem. Lid 30 also includes needle detaching device 40, which can be used to unwind various types of needle systems.

Medical waste, such as used needles, can be discarded by opening pivotal closure 32 and depositing the waste into the disposal container 2 through aperture 36. The discarded waste will drop into a container body attached to lid 30, similar to container body 4, shown in Figure 1.

Needle detaching device 40 can be used to unwind various needle systems that utilize unwinding for their disposal. For example, various needle systems may include a needle holder and a needle portion. Often, the needle portion includes a needle and a protective sheath made of plastic or the like; however, the needle portion may include a needle alone. The needle holder and the needle portion may be connected by threading a threaded portion of one of the elements into a receiving threaded portion of the other element. For example, the needle portion may include a threaded male end, and the needle holder may include a threaded female end. As such, to connect the needle holder and the needle portion, the needle portion is threaded to the needle holder. After using the needle system to draw blood or the like, the needle portion is preferably unwound from the needle holder in order to dispose of the needle portion. This can be accomplished by inserting the needle portion of the needle system into the needle detaching device 40 and rotating the needle holder until the needle

portion separates from the needle holder and drops into the container body.

Figure 3 provides a partial top view of lid 30 and illustrates needle detaching device 40 and funnel shaped aperture 38 in greater detail. In the exemplary embodiment shown in Figure 3, funnel-shaped aperture 38 includes a pair of depressions 44. The functionality of depressions 44 will be explained below. Although Figure 3 shows two depressions 44, this is simply an example of a number of depressions that could be included in the funnel-shaped aperture 38. It is understood that a single depression, or three or more depressions, could alternatively be included in funnel-shaped aperture 38.

Figure 4 provides a cross sectional side view of funnel-shaped aperture 38. Pivotal closure 34 is shown covering funnel-shaped aperture 38. Funnel-shaped aperture 38 includes a tapered inside wall 46 which extends to bottom edge 48. The pair of depressions 44, which are recesses formed in inside wall 46, are also shown in Figure 4. Although the aperture 38 is described as being substantially funnel-shaped, the aperture 38 could have a different shape such as a cylindrical shape or a square shape or a wide variety of alternative shapes.

Figure 5 provides an additional cross sectional side view of funnel-shaped aperture 38 that is perpendicular to the view shown in Figure 4. Again, pivotal closure 34 is shown covering funnel-shaped aperture 38. Also, inside wall 46 is shown extending to bottom edge 48. A front view of depression 44, as opposed to the side view provided in Figure 4, is also included in Figure 5.

As explained above, needle detaching device 40 nor aperture 38, shown in Figures 2 and 3, can accommodate every type of needle system that uses an unwinding disposal system. Therefore, as shown in Figure 6, an exemplary embodiment of the present invention provides

an adapter 50 that can be inserted into funnel-shaped aperture 38 of lid 30. As explained above, aperture 38 is not necessarily funnel-shaped, but should simply be able to accommodate an adapter 50. By using the adapter, alternative needle systems can be unwound, as will be explained below. Therefore, a single disposal container with lid 30 can be used to discard needle systems having either a configuration that can be accommodated by the aperture formed in the lid (e.g., aperture 38) or (2) a configuration that can be accommodated by the aperture formed in the adapter (e.g., aperture 52).

As shown in the perspective view of an exemplary adapter 50 provided in Figure 6, adapter 50 includes an upper edge 58 and a lower edge 59. Upper edge 58 extends through a beveled edge 56, and into side walls 54. Side walls 54 extend to the lower edge 59. Side walls 54 define a rectangular-shaped aperture 52, which can be used to unwind needle systems which are accommodated by a rectangular aperture. Although the shape of adapter 50 is defined in Figure 6 by upper edge 58, beveled edge 56, side walls 54, and lower edge 59, this is only an example of an adapter shape. Adapter 50 could take on any number of shapes so long as the adapter 50 can be accommodated within a lid aperture such as, for example, aperture 38. For example, adapter 50 could have a funnel-shaped exterior surface that would match the tapered shape of funnel-shaped aperture 38.

Lower edge 59 includes a pair of detents 60 (only a single detent 60 is visible from the perspective view in Figure 6). Although lower edge 59 includes two detents 60, this is simply an exemplary embodiment, and a single detent 60, or three or more detents 60, could alternatively be included. When adapter 50 is inserted into funnel-shaped aperture 38, each detent 60 is received by a depression 44 included in funnel-shaped aperture 38. The engagement of detents 60 and depressions 44 results in a resistance to rotation of the adapter 50 within funnel-shaped aperture 38. Funnel-shaped aperture 38, illustrated in Figures 3 and 4, includes two depressions 44. Adapter

50, illustrated in Figure 6, includes two detents 60. Therefore, when adapter 50 is inserted into funnel-shaped aperture 38, each detent 60 is received by a single depression 44. In an alternative embodiment, there could be more depressions 44 in funnel-shaped aperture 38 than
5 detents 60 on adapter 50. In other words, the number of depressions 44 in the funnel-shaped opening 38 should preferably be the same or greater than the number of detents 60 on the adapter 50.

As illustrated in the exemplary embodiment included in Figure 6, adapter 50 includes two flanges 62 (alternatively known as
10 "feet") which extend below lower edge 59 (only a single flange 62 is visible from the perspective view in Figure 6). When adapter 50 is inserted into funnel-shaped aperture 38 of lid 30, each flange 62 clasps around bottom edge 48 of funnel-shaped aperture 38. This engagement
15 between flanges 62 and bottom edge 48 releasably or permanently secures adapter 50 within funnel-shaped aperture 38 and provides resistance against the removal of adapter 50 from funnel-shaped aperture 38.

Figure 7 provides a top view of an exemplary adapter 50. As stated above, adapter 50 includes upper edge 58 which extends
20 downward through beveled edge 56, and into side walls 54. Side walls 54 define rectangular-shaped aperture 52. Rectangular-shaped aperture 52 may be used to unwind needle systems which are accommodated by a rectangular aperture. Adapter 50 could, however,
25 include an aperture with a shape other than a rectangular shape. For example, it may be desirable to provide a triangular-shaped or diamond-shaped aperture in the adapter 50 to accommodate differently configured needle systems, and other shapes are contemplated as well, depending upon the needle holder's configuration and design preferences.

30 Figure 8 provides a bottom view of an exemplary adapter 50. Adapter 50 includes upper edge 58 which extends through beveled edge

56 into side walls 54. Side walls 54 define rectangular-shaped aperture 52. Side walls 54 extend downwardly to lower edge 59. In the exemplary embodiment shown in Figure 8, adapter 50 includes two detents 60 that extend radially outwardly from lower edge 59, and two
5 flanges 62 that extend downwardly from lower edge 59 and radially outwardly. When adapter 50 is inserted into funnel-shaped aperture 38 of lid 30, detents 60 of the adapter 50 are received by depressions 44 of funnel-shaped aperture 38, thereby resisting rotation of adapter 50 within funnel-shaped aperture 38. Further, upon the engagement of
10 adapter 50 with funnel-shaped aperture 38, flanges 62 snap below and clasp around bottom edge 48 of the funnel-shaped aperture 38, thereby resisting axial removal of adapter 50 from funnel-shaped aperture 38.

Figure 9 provides a side view of an exemplary adapter 50. Adapter 50 includes upper edge 58 which extends through beveled edge
15 56 into side walls 54. Side walls 54 extend downward into lower edge 59. Detents 60 extend outwardly from lower edge 59. An external view of flange 62 (only one of the two flanges 62 is visible in Figure 9), which extends downward from lower edge 59, is also provided.

Figure 10 provides a cross sectional view of an exemplary
20 adapter 50. This cross sectional view illustrates the extension of upper edge 58 through beveled edge 56 and into side walls 54, and further illustrates the extension of side walls 54 to lower edge 59. Side walls 54 define rectangular-shaped aperture 52. Detents 60 extend out from lower edge 59. Also provided is an internal view of flange 62.

25 Figure 11 provides another cross sectional view of an exemplary adapter 50. This view is perpendicular to the cross sectional view provided in Figure 10. Again, upper edge 58 extends through beveled edge 56 into side walls 54. Side walls 54, which define rectangular-shaped aperture 52, extend downward to lower edge 59,
30 and then further extend downward into flanges 62.

Figure 12 provides a perspective view of an exemplary lid 30, with an adapter 50 engaged in the funnel-shaped aperture 38 of the lid 30. Lid 30 includes aperture 36, in addition to funnel-shaped aperture 38. Funnel-shaped aperture 38 receives adapter 50. Specifically, 5 depressions 44 (not shown in Figure 12) of funnel-shaped aperture 38 receive detents 60 (not shown in Figure 12) of the adapter 50, and thereby provide resistance to rotation of adapter 50 within funnel-shaped aperture 38. Further, flanges 62 (not shown in Figure 12) snap and clasp around bottom edge 48 (not shown in Figure 12) of funnel- 10 shaped aperture 38, thereby providing resistance to the removal of adapter 50 from funnel-shaped aperture 38. With adapter 50 engaged within funnel-shaped aperture 38, rectangular-shaped aperture 52 may be used to unwind needle systems that would be accommodated by the rectangular shape of aperture 52.

Figure 13 provides a perspective view of an exemplary needle 15 holder 64. Needle holder 64 and a needle portion (not shown) are included in a needle system which requires unwinding for disposal. The needle portion may include a needle and a protective sheath, or simply may include a needle alone, with no protective sheath. Needle holder 20 64 includes a threaded receiver 66. A needle portion (not shown) is threaded into threaded receiver 66. Although the needle portion and needle holder are engaged to one another by threading the needle portion into the threaded receiver 66, this is only an example of how the needle portion and the needle holder may be coupled. The needle 25 system, including the needle holder 64 and the needle portion, are used for their intended medical purpose. It is then desirable to dispose of the used needle system.

The use and operation of a disposal container according to this invention will now be described. Generally, this invention makes 30 possible to unwind a needle portion from a needle holder of a needle system having a second configuration using a container system including a receptacle and a lid such as lid 30, wherein the lid has an

aperture such as aperture 38 configured to receive a needle system having a first configuration. An adapter such as adapter 50 configured to receive the needle system having the second configuration is engaged in the lid aperture, thereby modifying the lid from being configured to receive the needle system having the first configuration to being configured to receive the needle system having the second configuration. At least a portion of the needle system having the second configuration is inserted into the adapter aperture such as the aperture 52 of the adapter 50, thereby engaging the needle portion to resist rotation of the needle portion with respect to the adapter. The needle holder is then rotated with respect to the adapter, thereby unwinding the needle portion from the needle system such that the needle portion is released into the receptacle.

More specifically, with reference to the embodiment selected for illustration in the Figures, in order to dispose of the needle system, a disposal container with a lid 30 is preferably utilized. In a preferred embodiment, lid 30 preferably includes funnel-shaped aperture 38, and adapter 50 is engaged within funnel-shaped aperture 38. In an exemplary embodiment, adapter 50 provides rectangular-shaped aperture 52. The needle portion of the needle system is inserted into rectangular-shaped aperture 52. The needle holder 64 is then rotated such that the needle portion unthreads from threaded receiver 66 of needle holder 64, and separates from the needle holder 64. The needle portion drops into the disposal container. The medical professional may then dispose of the needle holder in any approved manner, or may retain the needle holder 64 as desired.

Variations and modifications of the exemplary embodiments illustrated in the Figures can be made without departing from the scope of this invention. It should be recognized that the aperture provided in the lid of the container system can be provided with any configuration and is, therefore, not to be limited to a funnel-shaped aperture. Likewise, the adapter can be provided with an aperture having any

configuration and is not to be limited to a rectangular-shaped aperture. It is preferred, however, that the configuration of the lid's aperture differs from that of the adapter's aperture in either its size or its shape. In this way, the use of the adapter in connection with a container
5 system changes the configuration of the engagement mechanism from one configuration or size to another configuration or size. By changing the configuration of the container's engagement mechanism, for example, the adapter makes it possible to reconfigure a container system that was manufactured for use with one type or size of needle
10 holder system for use with another type of needle holder system.

For the foregoing reasons, neither the selected configuration of the aperture in the lid nor the selected configuration of the aperture in the adapter is important to this invention. Instead, those
15 configurations are selected based on design parameters, manufacturing techniques, cost considerations, and other factors.

Also, the nature of the means for engaging an adapter within a lid aperture is not important to this invention. Most preferably, the means for engagement between the adapter and the lid resists rotational movement of the adapter with respect to the lid and/or
20 resists axial movement of the adapter with respect to the lid. It is recognized, however, that the means for engagement between the adapter and the lid can alternatively be configured to permit movement, perhaps both axial and rotational, between the adapter and the lid if so desired.

25 It will be appreciated that additional variations and modifications of the disclosed, preferred embodiments can be made without departing from the scope of this invention, which is defined separately in the appended claims.